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| 10/038,915  | 01/08/2002  | Jianglei Ma          | 71493-1044/jlo      | 1308             |
| 7380  | 7590        | 12/15/2006           | EXAMINER            |                  |
| SMART & BIGGAR<br>P.O. BOX 2999, STATION D<br>900-55 METCALFE STREET<br>OTTAWA, ON K1P5Y6<br>CANADA |             |                      | MATTIS, JASON E     |                  |
|   |             |                      | ART UNIT            | PAPER NUMBER     |
|   |             |                      | 2616                |                  |

DATE MAILED: 12/15/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/038,915

Applicant(s)

MA ET AL.

Examiner

Jason E. Mattis

Art Unit

2616

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 28 September 2006.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-23 and 57-61 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-23 and 57-61 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 1/8/02 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 4 papers.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_.

### **DETAILED ACTION**

1. This Office Action is in response to the Response to Election/Restriction filed 9/28/06. Claims 1-23 of Group I have been elected. Claims 24-56 have been cancelled. New claims 57-61 have been added. Claims 1-23 and 57-61 are currently pending in the application.

### ***Drawings***

2. Figures 1A and 1B should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Claim Objections***

3. Claims 1, 5, 11-16, 19, and 22 are objected to because of the following informalities:

With respect to claims 1, 5, 15-16, 19, and 22, each of these claims contains the phrase "adapted to". This phrase generally relates to claim limitations that are not positively stated and may be considered optional. It is recommended that the phrase "adapted to" be removed from the claims.

With respect to claims 11-14, each of these claims uses the term "preamble" in place of the term "header" that is used in the language of claim 1. Since there is no antecedent basis for the term "preamble" it is recommended that this term be changed to "header".

With respect to claims 13 and 14, these claims both use brackets, "{}". It is recommended that the brackets be removed from the claims.

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1-2, 11, and 15-16 are rejected under 35 U.S.C. 102(e) as being anticipated by Wallace et al. (U.S. Pat. 6473467 B1).

**With respect to claims 1 and 15**, Wallace et al. discloses a MIMO-OFDM transmitter and receiver adapted to transmit and receive a header symbol format in which sub-carriers of a header OFDM symbol are divided into a non-contiguous set of sub-carriers for each of a plurality of antennas with each antenna transmitting the header OFDM symbol only on the respective set of sub-carriers **(See column 15 lines 8-36 and Figure 1C of Wallace et al. for reference to assigning disjoint sub-channel subsets to each antenna of a MIMO-OFDM transmitter and receiver for transmitting a pilot signal, which is a header OFDM symbol).**

**With respect to claims 2 and 16**, Wallace et al. discloses using N antennas with the set of sub-carriers assigned to each antenna being separated by N sub-carriers **(See column 15 lines 8-36 and Figure 1C of Wallace et al. for reference to an embodiment using 4 antennas with the set of sub-carriers used by each of the four antennas being separated by 4 sub-carriers).**

**With respect to claim 11**, Wallace et al. discloses using scattered pilots throughout an OFDM frame **(See column 15 lines 8-36 and Figure 1C of Wallace et al. for reference to using disjointed scattered pilot signals throughout an OFDM frame).**

### ***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 3, 7-10, 13, 17, 20, and 57-59 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wallace et al. in view of Ma et al. (U.S. Publication US 2002/0041635 A1).

**With respect to claims 3, 8-9, and 17,** Wallace et al. does not disclose using both a multiplexed dedicated pilot channel used for fine synchronization and a common synchronization channel used for course and fine synchronization for fast and accurate initial acquisition.

**With respect to claims 7 and 20,** Wallace et al. does not disclose sub-carriers having a BTS specific mapped complex sequence.

**With respect tot claim 13,** Wallace et al. does not disclose a sequence of a dedicated pilot channel and a common synchronization channel arranged in a predetermined order.

**With respect to claims 57-59,** Wallace et al. discloses transmitting an OFDM preamble having a prefix that is a cyclic repetition (**See column 14 lines 40-55 and Figure 1B of Wallace et al. for reference to appending a cyclic prefix/extension to an OFDM preamble**). Wallace et al. does not disclose following the prefix with two correlated header symbols.

**With respect to claims 3, 7-10, 13, 17, 20, and 57-59,** Ma et al., in the field of communications, discloses using a multiplexed dedicated pilot channel used for fine

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synchronization and a common synchronization channel used for course and fine synchronization for fast and accurate initial acquisition with the pilot and synchronization channels arranged in a predetermined order **(See page 2 paragraphs 23-24 and page 3 paragraphs 42-43 of Ma et al. for reference to using a pilot channel and a synchronization channel arranged in a predetermined order in an OFDM-MIMO system and for reference to using the synchronization channel to coarsely determined frame and for reference to using the synchronization channel and pilot channel for a fine synchronization stage)**. Ma et al. also discloses using sub-carriers having a BTS specific mapped complex sequence **(See page 3 paragraphs 38-39 and Figure 5 of Ma et al. for reference to each BST having a specific pilot channel for identification)**. Ma et al. further discloses using multiple correlated header symbols **(See page 3 paragraph 42 of Ma et al. for reference to using correlated OFDM symbols)**. Using a multiplexed dedicated pilot channel used for fine synchronization and a common synchronization channel used for course and fine synchronization for fast and accurate initial acquisition with the pilot and synchronization channels arranged in a predetermined order, using sub-carriers having a BTS specific mapped complex sequence, and using multiple correlated header symbols has the advantage of allowing quick and accurate synchronization as well as allowing individual BTS identification.

It would have been obvious to one of ordinary skill in the art at the time of the invention, when presented with the work of Ma et al., to combine using a multiplexed dedicated pilot channel used for fine synchronization and a common synchronization

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channel used for course and fine synchronization for fast and accurate initial acquisition with the pilot and synchronization channels arranged in a predetermined order, using sub-carriers having a BTS specific mapped complex sequence, and using multiple correlated header symbols, as suggested by Ma et al., with the system and method of Wallace et al., with the motivation being to allow quick and accurate synchronization as well as allow individual BTS identification.

8. Claims 4, 12, 14, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wallace et al. in view of Ma et al. as applied to claims 3, 7-10, 13, 17, 20, and 57-59 above, and further in view of Makipaa (U.S. Publication US 2001/0031639 A1).

**With respect to claims 4, 12, 14, and 18**, the combination of Wallace et al. and Ma et al. does not disclose using a broadcasting channel.

**With respect to claims 4, 12, 14, and 18**, Makipaa, in the field of communications, discloses an OFDM system using a broadcasting channel (**See page 2 paragraph 31 and page 3 paragraph 37 of Makipaa for reference to using a broadcasting channel in addition to a pilot channel and a synchronization channel in an OFDM system**). Using a broadcasting channel has the advantage of allowing data other than synchronization data to be sent to all receivers of a system at the same time.

It would have been obvious to one of ordinary skill in the art at the time of the invention, when presented with the work of Makipaa, to combine using a broadcasting



channel, as suggested by Makipaa, with the system and method of Wallace et al. and Ma et al., with the motivation being to allow data other than synchronization data to be sent to all receivers of a system at the same time.

9. Claims 5-6 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wallace et al. in view of the Applicant's admitted prior art.

**With respect to claims 5-6 and 19**, Wallace et al. discloses transmitting an OFDM preamble having a prefix that is a cyclic repetition (**See column 14 lines 40-55 and Figure 1B of Wallace et al. for reference to appending a cyclic prefix/extension to an OFDM preamble**). Wallace et al. does not disclose following the prefix with two identical header symbols.

**With respect to claims 5-6 and 19**, the Applicant's admitted prior art discloses using multiple identical header symbols (**See page 4 line 18 to page 5 line 6 of the Applicant's specification for reference to using repeated OFDM symbols**). Using multiple identical header symbols has the advantage of allowing synchronization to be more easily obtained.

It would have been obvious to one of ordinary skill in the art at the time of the invention, when presented with the Applicant's admitted prior art, to combine using multiple identical header symbols, as suggested by Applicant's admitted prior art, with the system and method of Wallace et al., with the motivation being to allow synchronization to be more easily obtained.

10. Claims 21-23 rejected under 35 U.S.C. 103(a) as being unpatentable over Wallace et al. in view of Applicant's admitted prior art as applied to claims 5-6 and 19 above, and further in view of Ma et al.

**With respect to claim 21**, Wallace et al. does not disclose sub-carriers having a BTS specific mapped complex sequence.

**With respect to claims 22 and 23**, Wallace et al. does not disclose using both a multiplexed dedicated pilot channel used for fine synchronization and a common synchronization channel used for course and fine synchronization for fast and accurate initial acquisition.

**With respect to claims 21-23**, Ma et al., in the field of communications, discloses using a multiplexed dedicated pilot channel used for fine synchronization and a common synchronization channel used for course and fine synchronization for fast and accurate initial acquisition with the pilot and synchronization channels arranged in a predetermined order (See page 2 paragraphs 23-24 and page 3 paragraphs 42-43 of Ma et al. for reference to using a pilot channel and a synchronization channel arranged in a predetermined order in an OFDM-MIMO system and for reference to using the synchronization channel to coarsely determined frame and for reference to using the synchronization channel and pilot channel for a fine synchronization stage). Ma et al. also discloses using sub-carriers having a BTS specific mapped complex sequence (See page 3 paragraphs 38-39 and Figure 5 of Ma et al. for reference to each BST having a specific pilot channel for identification). Ma et al. further discloses using multiple correlated header symbols

**(See page 3 paragraph 42 of Ma et al. for reference to using correlated OFDM symbols).** Using a multiplexed dedicated pilot channel used for fine synchronization and a common synchronization channel used for course and fine synchronization for fast and accurate initial acquisition with the pilot and synchronization channels arranged in a predetermined order, using sub-carriers having a BTS specific mapped complex sequence, and using multiple correlated header symbols has the advantage of allowing quick and accurate synchronization as well as allowing individual BTS identification.

It would have been obvious to one of ordinary skill in the art at the time of the invention, when presented with the work of Ma et al., to combine using a multiplexed dedicated pilot channel used for fine synchronization and a common synchronization channel used for course and fine synchronization for fast and accurate initial acquisition with the pilot and synchronization channels arranged in a predetermined order, using sub-carriers having a BTS specific mapped complex sequence, and using multiple correlated header symbols, as suggested by Ma et al., with the system and method of Wallace et al. and Applicant's admitted prior art, with the motivation being to allow quick and accurate synchronization as well as allow individual BTS identification.

11. Claims 60-61 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wallace et al. in view of Ma et al. as applied to claims 3, 7-10, 13, 17, 20, and 57-59 above, and further in view of Applicant's admitted prior art.

**With respect to claims 60 and 61**, the combination of Wallace et al. and Ma et al. does not disclose following the prefix with two identical header symbols.

**With respect to claims 60 and 61**, the Applicant's admitted prior art discloses using multiple identical header symbols (**See page 4 line 18 to page 5 line 6 of the Applicant's specification for reference to using repeated OFDM symbols**). Using multiple identical header symbols has the advantage of allowing synchronization to be more easily obtained.

It would have been obvious to one of ordinary skill in the art at the time of the invention, when presented with the Applicant's admitted prior art, to combine using multiple identical header symbols, as suggested by Applicant's admitted prior art, with the system and method of Wallace et al. and Ma et al., with the motivation being to allow synchronization to be more easily obtained.


### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason E. Mattis whose telephone number is (571) 272-3154. The examiner can normally be reached on M-F 8AM-5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Huy Vu can be reached on (571) 272-3155. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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